



FATSCOPY & FDREPORT

Using FDREPORT for Tape Migration with FATSCOPY

MAY 2014

FDREPORT LICENSE

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Audience: *This document is written to be used by either a customer directly, by consultants / VAR's, or the manufacturers.*

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Part 1

Introduction

1.1 What is FATSCOPY?

FATSCOPY offers a high-performance and automated process for moving and re-cataloging tape-based data sets. Whether you're consolidating tape data to higher capacity tapes, converting to new tape media, or implementing or replacing a Virtual Tape System, FATSCOPY is an ideal tool for the mass re-location of data from one tape media to another.

FATSCOPY can copy individual files or the entire contents of one or more tape volumes, either to a new tape or to a VTS.

FATSCOPY can select the data sets to be copied or migrated from your system catalogs or from your tape management database. You can specify the data sets by:

- data set name prefixes or masks (such as JAT.DATA.**)
- tape volume serial prefixes or ranges
- catalog tape device type (3480, 3490E, or 3590)

Additionally, filtering can be done on the data sets to be copied based on tape management system information including:

- creation date
- expiration date
- creating job name and/or step name
- data set size

FATSCOPY also supports an image copy of the tape volume including the volume label, header labels, and trailer labels.

1.2 What is FDREPORT?

FDREPORT is a generalized report writer that can generate custom reports on DASD and TAPE related data. Using simple control statements, you can generate both simple and complex reports..

You can generate reports on a few data sets, large numbers of data sets, whole DASD volumes, or your entire installation. You can select data through the system catalogs or directly from DASD volumes or from IBM's DFSMSrmm and CA Technologies' CA 1 tape management systems. You can generate a data file for further reporting or pass the data to other programs for further analysis. You can even punch JCL or control statements for other programs using the report data.

FDREPORT is a planning tool that can be used with DFSMSrmm or CA 1 tape management systems to query the tape management databases. FDREPORT can run against the active DFSMSrmm or CA 1 database and/or you can create a permanent extract file. FDREPORT can create a tape management extract file in a few minutes.

FDREPORT supports more "field names/selection criteria" than FATSCOPY and is also able to create the SELECT statements for the FATSCOPY job. This makes FDREPORT/FATSCOPY a very powerful combination.

Part 2

Planning for the Migration

2.1 What Do We Need to Know Before We Start the Migration?

- How many tapes are involved?
 - 500, 25,000, 75,000, ...
- How many files?
 - 100,000, 300,000, 700,000, 1 million+
- How much data is on the tapes?
- Where are the tapes located?
- How much of the data is still active?
- How much of the data has expired?
- How many volumes and data sets will expire shortly and will not need to be migrated to the new tape library?
- Do you have tapes managed by proprietary products like CA View that maintain information about the tapes in an external database?
- What is the total capacity and type of tape? For example:

Sample Output:

DFSMSRMM TAPES < 20% FULL

ON 2013.345 AT 09.52.30

VOLSER	%FU	VOLUSEBYTES	VOLCAPBYTES	MDREFORM	MEDIATYP
D00002	1	0.335M	838.861M	36TRACK	ECCST
D00146	1	0.151M	838.861M	36TRACK	ECCST
D00147	1	0.308M	838.861M	36TRACK	ECCST
D00150	1	0.540M	838.861M	36TRACK	ECCST
...					
M30806	19	2599.834M	9999.221M	128TRACK	HPCT
ST0006	19	13258.621M	39996.883M	256TRACK	HPCT
900008	19	2951.579M	9999.221M	*	HPCT

Media Recording Format	
*	Undefined
EEFMT2	Enterprise Encrypted Format 2
EEFMT3	Enterprise Encrypted Format 3
EEFMT4	Enterprise Encrypted Format 4
EFTM1	Enterprise Format 1
EFMT2	Enterprise Format 2
EFMT3	Enterprise Format 3
EFMT4	Enterprise Format 4
18TRK	18 Track Format
36TRK	36 Track Format
128TRK	128 Track Format
256TRK	256 Track Format
384TRK	384 Track Format

Summary Output:

FINAL TOTALS --

TVUSEBYT-991977.606M

VALUE SUMMARY OF TVMEDRFM--- TOTAL NUMBER

TVMEDRFM---	*	()	
EEFMT4	(		)	3
EFMT4	(		)	1
128TRACK	(		)	121
256TRACK	(		)	48
36TRACK	(		)	78

VALUE SUMMARY OF TVMEDTYP--- TOTAL NUMBER

TVMEDTYP---	*	()	
EATC	(		)	1
ECCST	(		)	78
EHPCT	(		)	7
EXTC	(		)	2
HPCT	(		)	163

Media Type	
*	Undefined
CST	Cartridge System Tape
EAETC	Enterprise Advanced Economy Tape Cartridge - JK
EATC	Enterprise Advanced Tape Cartridge - JC
EAWTC	Enterprise Advanced WORM Tape Cartridge - JY
ECCST	Enhanced Capacity Cartridge System Tape
EETC	Enterprise Economy Tape Cartridge - JJ
EEWTC	Enterprise Economy WORM Tape Cartridge - JR
EHPCT	Extended High Performance Cartridge Tape - K
ETC	Enterprise Tape Cartridge - JA
EWTC	Enterprise WORM Tape Cartridge - JW
EXTC	Enterprise Extended Tape Cartridge - JB
EXWTC	Enterprise Extended WORM Tape Cartridge - JX
HPCT	High Performance Cartridge Tape

See [section 2.4 on page 9](#) for a sample checklist of FDREPORT jobs you can run to help you plan for a successful migration.

2.2 FDREPORT support of DFSMSrmm tape management system

FDREPORT 5.4L78 or higher is able to extract information from IBM's DFSMSrmm product and process it just as it does for DASD related information. This information can be formatted, filtered, sorted, and summarized using FDREPORT's existing facilities.

DFSMSrmm Tape Volume Fields

The DFSMSrmm fields related to tape volumes include:

- Basic information (e.g., volume serial, volume label, media type, density)
- Location information (e.g., home, current, old, required, type)
- Status information (e.g., retention/expiration values, date last accessed, date last written, last drive used, volume capacity, error counts)
- Access information (e.g., last changing user, owner, owner access authority, volume access authority)

DFSMSrmm Tape Data Set Fields

The DFSMSrmm fields related to tape data sets include:

- Basic information (e.g., data set name, owner, volume serial, blocksize)
- Historical information (e.g., when was the data set created and by what job, step, and program; when and by what job, step, and program was the data set read or written)
- Size information (e.g., block counts)
- Operating system information (e.g., is the data set cataloged, is it SMS managed)
- Management information (DFSMSrmm's Vital Record constructs)

2.3 FDREPORT support of CA 1 tape management system

FDREPORT 5.4L80 or higher is able to extract information from CA Technologies CA 1 product and process it just as it does for DASD related information. This information can be formatted, filtered, sorted, and summarized using FDREPORT's existing facilities.

CA 1 Tape Volume Fields

The CA 1 fields related to tape volumes include:

- Basic information (e.g., volume serial, volume label, recording technique, density)
- Location information (e.g., out of area, date, and code)
- Status information (e.g., retention/expiration values, date last accessed, last drive used, volume capacity, error counts)

CA 1 Tape Data Set Fields

- The CA 1 fields related to tape data sets include:
- Basic information (e.g., data set name, volume serial, blocksize)
- Historical information (e.g., when was the data set created and by what job, step, and program; when and by what job and program was the data set read or written)
- Size information (e.g., block counts)
- Operating system information (e.g., is the data set cataloged, is it SMS managed)

2.4 Tape Migration Checklist

A tape migration checklist similar to this should be created to ensure a successful migration is done.

		Section	FTP Member Name
1. <input type="checkbox"/>	Producing an extract file of your tape inventory using FDREPORT.	3.1	Create_RMM_Extract_File.txt Create_CA1_Extract_File.txt
2. <input type="checkbox"/>	Tape library inventory report of all tapes.	3.2	Tape_Library_Inventory.txt
3. <input type="checkbox"/>	Tape library inventory report excluding tapes in INIT and SCRATCH status.	3.3	Tape_Inventory_Excluding_INIT_and_SCRATCH.txt
4. <input type="checkbox"/>	Report of tapes to be excluded from migration that are not in INIT and SCRATCH status. This example excludes tapes that expire in the next NN days.	3.4	Tapes_Excluded_From_Migration.txt
5. <input type="checkbox"/>	Inventory of all tapes to be migrated. This excludes the tapes identified in steps 3 and 4. This criteria is used for all subsequent jobs.	3.5	Tapes_Eligible_for_Migration.txt
6. <input type="checkbox"/>	Identify those tapes that require Image Copy, such as OAM. See user manual for restrictions.	3.6	Tapes_Requiring_Image_Copy.txt
7. <input type="checkbox"/>	Identify archive tapes created by products such as ABR and HSM.	3.7	Archive_Tapes.txt
8. <input type="checkbox"/>	Identify tapes with read errors so they can be processed separately.	3.8	Tapes_with_Permanent_Read_Errors.txt
9. <input type="checkbox"/>	Determine the total number of bytes of each tape in the tape library to be migrated?	3.9	Volume_Usage_Report.txt
10. <input type="checkbox"/>	Inventory of off-site tapes.	3.10	Tapes_Grouped_by_Location.txt
11. <input type="checkbox"/>	Identify tapes with highest/lowest priority in migration process. This may be tapes used by a specific application or heavily used tapes.	3.11	Last_Reference_Report.txt
12. <input type="checkbox"/>	Identify multi-volume tape sets.	3.12	Tapes_in_Multivolume_Sets.txt
13. <input type="checkbox"/>	Identify tapes that are single volume, multiple files.	3.13	Single_Volume_Multi_File_Tapes.txt
14. <input type="checkbox"/>	Identify tapes that are single volume, single file.	3.14	Single_Volume_Single_File_Tapes.txt
15. <input type="checkbox"/>	Example of FDREPORT punching out control cards for FATSCOPY.	3.15	Create_FATSCOPY_Job_with_FDREPORT.txt

Part 3

Run the Reports

3.1 Produce Extract File

In our first example, we are going to create an extract file that will provide us with a point-in-time reference source for our initial **pre-migration** and **during-migration** reporting. The use of this extract file speeds up the reporting process as the detailed data can be extracted from the tape management system **once only**, and then subsequent reports can be run quicker and more efficiently against the extracted data.

Once the migration process has been completed, another extract file can be created and the reporting process re-run to ensure that all tapes involved in the migration process have been successfully moved to the new media. This second extract file will help to identify any new tapes that may have been created after the first extract file was taken and during the migration. These tapes can then be converted as required. Refer to Section 54.16 "FDREPORT EXTRACT Statement" in the FDR documentation for information on creating the extract file.

JCL and Control Statements (RMM):

```
/**+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7
/** CREATE EXTRACT FILE FOR FDREPORT RMM REPORTING
/**+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7
//EXTRACT EXEC PGM=FDREPORT
...
//SYSIN DD *
    EXTRACT PRODUCT=RMM,STORCLAS=TSTDATA,DSN=extract-data-set-name,
        DISP=RETAIN
/*
```

FTP Member Name: **Create_RMM_Extract_File.txt**

Sample Output:

```
FDRABR VTOC REPORT CREATE/PRINT - FDREPORT VER 5.4/80P - INNOVATION DATA PROCESSING
CARD IMAGE - * EXTRACT PRODUCT=RMM,STORCLAS=TSTDATA,DSN=extract-data-set-name,
CARD IMAGE - * DISP=RETAIN
RMM EXTRACT FUNCTION STARTED - 04.21.01
-> RMM EDGHSKP Extract Elapsed Time: 40.38 Seconds. DSN=extract-data-set-name
RMM EXTRACT FUNCTION ENDED - 04.21.42
FDREPORT(5.4/80P ) PROCESSING COMPLETED
```

JCL and Control Statements (CA 1):

```
/**+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7
/** CREATE EXTRACT FILE FOR FDREPORT CA 1 REPORTING
/**+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7
//EXTRACT EXEC PGM=FDREPORT
...
//SYSIN DD *
    DEFAULT SORTALLOC=YES,CA1TMC=CA1.TMC
    EXTRACT PRODUCT=CA1,STORCLAS=TSTDATA,DSN=extract-data-set-name,
        DISP=RETAIN
/*
```

FTP Member Name: **Create_CA1_Extract_File.txt**

Sample Output:

```
FDRABR VTOC REPORT CREATE/PRINT - FDREPORT VER 5.4/80P - INNOVATION DATA PROCESSING
CARD IMAGE - * DEFAULT STORCLAS=YES,CA1TMC=CA1.TMC
CARD IMAGE - * EXTRACT PRODUCT=CA1,STORCLAS=TSTDATA,DSN=extract-data-set-name,
CARD IMAGE - * DISP=RETAIN
RMM EXTRACT FUNCTION STARTED - 04.52.11
-> RMM EDGHSKP Extract Elapsed Time: 40.38 Seconds. DSN=extract-data-set-name
RMM EXTRACT FUNCTION ENDED - 04.52.52
FDREPORT(5.4/80P ) PROCESSING COMPLETED
```

3.2 Tape Library Inventory

This first example report produces an inventory of our entire tape library. We've used TVXTDATE and TVXTTIME to include in the title the date and time that the extract file we're reporting against was created. The report is sorted in tape volser order. Other information displayed in this report includes the retention and expiration dates of the tape, the current location of the tape, and the amount of data contained on the tape.

This consolidated list of tape volumes provides an ideal point-in-time record of **all** the tape volumes currently held within the tape library.

As you can see from the 1-line summary at the end of the sample, we have 261,698 tapes in the library currently holding 170Tb of data.

JCL and Control Statements

```

/*-----1-----2-----3-----4-----5-----6-----7
/* GENERATE REPORT ON ALL TAPE VOLUMES
/*-----+-----+-----+-----+-----+-----+-----7
//FDREPORT EXEC PGM=FDREPORT,REGION=0M
//RMMXTR DD DISP=SHR,DSN=extract-data-set-name
...
//SYSIN DD *
  TITLE LINE='REPORT ON ALL TAPE VOLUMES +
          - EXTRACT FILE <TVXTDATE> AT <TVXTTIME>'
  SORT FIELD=TVVOLSER
  REPORT FIELD=(TVVOLSER,TVOWNER,TVRTVALU,TVEXDATE,
                TVLOCAT,TVUSEBYT)
  SUMMARY FIELD=(TVVOLSER,TVUSEBYT)
  PRINT DATATYPE=RMMVOL,DISABLE=SUMVALUES,
        SORTALLOC=CYL,SORTCORE=8000000
/*

```

FTP Member Name: [Tape_Library_Inventory.txt](#)

Sample Output

REPORT ON ALL TAPE VOLUMES - EXTRACT FILE 2013.326 AT 14.25.19					
VOLSER	OWNER	RETENTVALU	EXPDAT	LOCATION	VOLUSEBYTES
110103				SHELF	41832.448K
116499				SHELF	37637.120K
117970				SHELF	32067.584K
118847				SHELF	32690.176K
125179				SHELF	41044.992K
125691				SHELF	31708.160K
151000	SOVPROC	CYCL/99999	2012.005	SHELF	0.000K
151001	SOVPROC	CYCL/99999	2013.003	SHELF	0.000K
151002	SOVPROC		2013.326	DOSS	0.000K
151003	SOVPROC		2013.326	DOSS	0.000K
...					
886073				SHELF	36131.840K
893071				SHELF	33214.464K
899467				SHELF	42518.528K
912196	CD9R04		2099.365	SHELF	359737.344K
FINAL TOTALS --					
TVVOLSER-----		261698	TVUSEBYT-175322.512G		

3.3 Tape Library Inventory Excluding Tapes in INIT and SCRATCH Status

This report is a variation of example 3.2 in that it uses an XEXCLUDE statement and TVSTATUS field variable to exclude any tapes in INIT and SCRATCH status.

This report may prove to be more useful than example 3.2 since it provides a better idea of the number of tapes in the library that are currently in use and that need migrating; you can see from our sample report that the number of tapes decreased to 200,287 (from 261,698 in the original report).

JCL and Control Statements:

```
//*-+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7
//* TAPE LIBRARY INVENTORY EXCLUDING TAPES WITH STATUS INIT AND
//* SCRATCH STATUS
//*-+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----7
//FDREPORT EXEC PGM=FDREPORT,REGION=0M
//RMMXTR DD DISP=SHR,DSN=extract-data-set-name
...
//SYSIN DD *
XEXCLUDE TVSTATUS=(INIT,SCRATCH)
TITLE LINE='LIST TAPES - EXCLUDE TAPES WITH STATUS INIT +
AND SCRATCH - EXTRACT FILE <TVXTDATE>'
REPORT FIELD=(TVVOLSER,TVOWNER,TVRTVALU,TVEXDATE,
TVLOCAT,TVUSEBYT)
SORT FIELD=TVVOLSER
SUMMARY FIELD=TVVOLSER
PRINT DATATYPE=RMMVOL,DISABLE=SUMVALUE,
SORTALLOCC=CYL,SORTCORE=8000000
/*
```

FTP member name: **Tape_Inventory_Excluding_INIT_and_SCRATCH.txt**

Sample Output:

LIST TAPES - EXCLUDE TAPES WITH STATUS INIT AND SCRATCH - EXTRACT FILE 2013.326					
VOLSER	OWNER	RETENTVALU	EXPDAT	LOCATION	VOLUSEBYTES
151309	SOVPROC		2013.314	SHELF	0.000K
151310	SOVPROC	CYCL/99999	2013.276	SHELF	0.000K
151311	SOVPROC	CYCL/99999	2013.059	SHELF	0.000K
151312	SOVPROC	CYCL/99999	2013.213	SHELF	0.000K
151313	SOVPROC	CYCL/99999	2013.276	SHELF	0.000K
200002	CC3G40		2099.365	SHELF	21041.650M
200003	DSNMSTR		2013.341	SHELF	3694.789M
200004	CD9R04		2099.365	SHELF	21041.650M
200005	OAM		1999.366	SHELF	28800.102M
200007	DSNMSTR		2013.341	SHELF	3694.789M
...					
503119	CD9R90		2013.344	SHELF	317348.864K
503120	CD9R90		2013.345	SHELF	317414.400K
503121	OAM		1999.366	SHELF	757510.144K
912196	CD9R04		2099.365	SHELF	359737.344K
FINAL TOTALS --					
TVVOLSER-----		200287	TVUSEBYT-161990.466G		

3.4 Tapes Excluded from Migration

In most client shops there will be various categories of tapes that will be excluded from (or handled separately from) the main migration process. This next example report can be used to provide a list of the tapes that you may wish to **exclude** from the migration project. The variables within this example report can be adjusted to meet your own specific criteria.

In the supplied example, TVEXDAYS=<90 is used to identify tapes that have 90 or less days to their expiry as these tapes can be allowed to expire naturally and may not need to be migrated. In our summary report, we have identified 28,481 tapes that will expire within the next 90 days. There may, of course, be other site-specific criteria that determines that a tape would be excluded from your migration; and these tapes can be included in the migration exclusion report by adding additional XEXCLUDE or XSELECT statements as required.

JCL and Control Statements:

```
//*+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7
/* LIST TAPES THAT WILL EXPIRE WITHIN 90 DAYS
/*+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----7
//FDREPORT EXEC PGM=FDREPORT,REGION=0M
//RMMXTR DD DISP=SHR,DSN=extract-data-set-name
...
//SYSIN DD *
XEXCLUDE TVSTATUS=(INIT,SCRATCH)
XSELECT TVEXDAYS=<90
TITLE LINE='LIST TAPES THAT WILL EXPIRE WITHIN 90 DAYS +
- EXTRACT FILE <TVXTDATE>'
SORT FIELD=TVEXDAYS
REPORT FIELD=(TVVOLSER,TVOWNER,TVRTVALU,TVEXDATE,TVLOCAT,TVUSEBYT)
SUMMARY FIELD=(TVVOLSER,TVUSEBYT)
PRINT DATATYPE=RMMVOL,DISABLE=SUMVALUES,BYTEFORMAT=MEGABYTES
/*
```

← Excludes INIT and SCRATCH tapes

← Identify tapes that will expire within 90 days

FTP member name: **Tapes_Excluded_From_Migration.txt**

Sample Output:

LIST TAPES THAT WILL EXPIRE WITHIN 90 DAYS - EXTRACT FILE 2013.326

VOLSER	OWNER	RETENTVALU	EXPDAT	LOCATION	VOLUSEBYTES
424494	AD9I62		2013.268	SHELF	0.077M
425252	AD9I62		2013.268	SHELF	0.028M
425398	AD9I62		2013.268	SHELF	0.033M
...					
358986	CK2U02		2014.125	SHELF	381.334M
362031	CK2U01		2014.125	SHELF	348.968M
362110	CK2U01		2014.125	SHELF	364.254M

FINAL TOTALS --
TVVOLSER-----28481 TVUSEBYT--16391.711G

TAPES PER STATUS
SUBTOTAL -- TVSTATUS--SCRATCH
TVVOLSER-----94
SUBTOTAL -- TVSTATUS--MASTER
TVVOLSER-----4518
FINAL TOTALS --
TVVOLSER-----4612

TAPES PER LOCATION
SUBTOTAL -- TVLOCAT---AWAATL1
TVVOLSER-----3666
SUBTOTAL -- TVLOCAT---DISTANT
TVVOLSER-----944
SUBTOTAL -- TVLOCAT---SHELF
TVVOLSER-----2
FINAL TOTALS --
TVVOLSER-----4612

VOLUME USAGE REPORT
FINAL TOTALS --
TVVOLSER-----4518 TVUSEBYT--128609.105G
REFERENCED >430 DAYS AGO
FINAL TOTALS --
TVVOLSER-----933 TVUSEBYT--13581.056G

Getting Summary Information

All the example reports we've looked at so far include the detailed information for each tape that matches the selection or exclusion criteria. If you need to run a report that only reflects the number of tapes and other summary information rather than the specific details of each tape, simply add the RPTYPE=NONE option to the PRINT statement.

If you want a report that contains the detail **and** summary information, but you want the summary information separate from the main report, add an ABRSUM DD (to SYSOUT=*) to the report JCL.

3.5 Tapes Eligible for Migration

This example report is the opposite of example 3.4 in that we are now listing all the tapes that will be **included** in the migration process (excluding the tapes that are not eligible). Our report will list all the non-INIT and non-SCRATCH tapes that have an expiry date greater than 90 days. As you can see from the 1-line summary, our total of tapes to migrate has now decreased from 200,287 (in example 3.3) to 171,819. The report is sorted in ascending Expiry Date (EXDATE) order so that the tapes in the report are listed in the order that they would eventually expire - right through to the tapes with a 65535 expiry date. Tapes that are to be retained for as long as they remain cataloged are displayed with a WHILECATLG in the RETENTVALU column. The report also shows the amount of data on each tape and the 1-line summary shows that the amount of data to be migrated has decreased from 170Tb in our original inventory (example 3.2) to 142Tb (a 16% reduction).

JCL and Control Statements:

```

/**+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7
/* LIST TAPE VOLUME USAGE OF TAPES WITH RETPD > 90 AND ARE NOT IN
/* INIT OR SCRATCH STATUS.
/* YOU MAY WANT TO ADD OTHER SELECTION CRITERIA TO FURTHER LIMIT THE
/* VOLUMES WHICH YOU WANT TO MIGRATE.
/**+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----7
/* TVTRTVALU - RETENTION VALUE:
/*          CATRETPD
/*          CYCL//NNNNN
/*          PERMANENT
/*          WHILECATLG
/**+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----7
//FDREPORT EXEC PGM=FDREPORT,REGION=0M
//RMMXTR DD DISP=SHR,DSN=extract-data-set-name
...
//SYSIN DD *
    XEXCLUDE TVSTATUS=(INIT,SCRATCH)
    XEXCLUDE TVEXDAYS=<90
    TITLE LINE='TAPES WITH RETPD > 90 - EXTRACT FILE <TVXTDATE>'
    SORT FIELD=TVEXDAYS
    REPORT FIELD=(TVVOLSER,TVEXDAYS,TVEXDATE,TVTRTVALU,TVUSEBYT)
    SUMMARY FIELD=(TVVOLSER,TVUSEBYT)
    PRINT DATATYPE=RMMVOL,DISABLE=SUMVALUES,BYTEFORMAT=MEGABYTES
/*

```

↪ Excludes INIT and SCRATCH tapes

↪ Excludes tapes that will expire within 90 days

FTP member name: **Tapes_Eligible_for_Migration.txt**

Sample Output:

VOLUME USAGE OF TAPES WITH RETPD > 90 - EXTRACT FILE 2013.326				
VOLSER	EXDAY	EXPDAT	RETENTVALU	VOLUSEBYTES
302536	91	2014.125		2353.084M
302547	91	2014.125		61.654M
302634	91	2014.125		209.944M
306003	91	2014.125		35.381M
316711	91	2014.125		18.996M
...				
503100	65535	1999.366		2432.168M
503101	65535	1999.366		11721.594M
503102	65535	2013.318	WHILECATLG	1243.341M
503103	65535	1999.366		9092.801M
503104	65535	1999.366		11747.606M
503106	65535	1999.366		8237.142M
503108	65535	2013.325	WHILECATLG	388.219M
FINAL TOTALS --				
TVVOLSER-----171819 TVUSEBYT-145606.500G				

3.6 Tapes Requiring Image Copy

In some situations, there may be tapes that require migration but are externally managed such as OAM and 3rd party applications. These tapes require special handling and would require a FATSCOPY "image copy" rather than a file-by-file copy. See the FATSCOPY user documentation for a full description of the "image copy" process.

In our example report, we have included several XSELECT statements to identify OAM data sets that we know will require special handling. In the 1-line summary you will see that we have 1,178 tape volumes containing one or more such data sets.

JCL and Control Statements:

```

/**-+-----1-----2-----3-----4-----5-----6-----7
/* * EXTERNAL MANAGED TAPES LIKE OAM AND 3RD PARTY APPLICATIONS
/**-+-----1-----2-----3-----4-----5-----6-----7
//FDREPORT EXEC PGM=FDREPORT,REGION=0M
//RMMXTR DD DISP=SHR,DSN=extract-data-set-name
...
//SYSIN DD *
  XEXCLUDE TDSTATUS=(INIT,SCRATCH)
  XEXCLUDE TVEXDAYS=<90
  XSELECT TDDSNAME=(OAM.PRIMARY.DATA,
                    OAM.BACKUP.DATA,
                    OAM.BACKUP2.DATA)

  TITLE LINE='OAM TAPES REQUIRING IMAGE COPY +
            - EXTRACT FILE <TDXTDATE>'

  REPORT FIELDS=(TDVOLSER,TDJRJOB,TDDSNAME,TDEXDATE,TDAPRSIZ)
  SUMMARY FIELD=(TDVOLSER,TDDSNAME,TDAPRSIZ)
  PRINT DATATYPE=RMMDSN,DISABLE=SUMVALUES,BYTEFORMAT=MEGABYTES,
        SORTALLOC=CYL,SORTCORE=8000000
/*

```

FTP member name: **Tapes_Requiring_Image_Copy.txt**

Sample Output:

OAM TAPES REQUIRING IMAGE COPY - EXTRACT FILE 2013.326				
VOLSER	CREATJOB	DATA SET NAME	EXPDAT	APPROXSIZE
200005	OAM	OAM.BACKUP.DATA	1999.366	28800.102M
200225	OAM	OAM.BACKUP.DATA	1999.366	87399.782M
200243	OAM	OAM.BACKUP.DATA	1999.366	88987.659M
200263	OAM	OAM.BACKUP.DATA	1999.366	90661.695M
200453	OAM	OAM.BACKUP.DATA	1999.366	93860.152M
200491	OAM	OAM.BACKUP.DATA	1999.366	77810.569M
200497	OAM	OAM.BACKUP.DATA	1999.366	102859.619M
...				
503099	OAM	OAM.PRIMARY.DATA	1999.366	2472.922M
503100	OAM	OAM.PRIMARY.DATA	1999.366	2432.168M
503101	OAM	OAM.PRIMARY.DATA	1999.366	11721.594M
503103	OAM	OAM.PRIMARY.DATA	1999.366	9092.801M
503104	OAM	OAM.PRIMARY.DATA	1999.366	11747.606M
503106	OAM	OAM.PRIMARY.DATA	1999.366	8237.142M
FINAL TOTALS --				
TDVOLSER-----1178		TDDSNAME-----1178	TDAPRSIZ--22777.538G	

3.7 Archive Tapes

Most mainframe shops operate an "archive" or "migration" policy (using tools such as FDRABR or DFSMSHsm) to move infrequently used data from prime disk to a less expensive medium. If that medium is tape, the tape migration process may need to handle the tapes containing archived/migrated data separately from other tapes in the library. Both FDRABR and DFSMSHsm use standard naming conventions for their archive/migration data sets, so it is very easy to run a report to identify those tape files.

In our example, we are using an XSELECT statement to find all the tape volumes that contain one or more data sets starting with the standard identifier of FDRABR.V*.B*. An additional XSELECT statement is provided in the example job for HSM.HMIGTAPE.** - simply switch the commenting asterisk if you wish to run the report to identify HSM migration tape files.

The sample report lists each tape volser that has been found to contain at least one ABR archive data set, and the individual tape files contained on that tape are displayed. We've added a BREAK operand to the SORT statement so that we get a summary after each tape volume and a final summary at the end, which shows that we have 55 tapes in total, containing 21,675 ABR archive data sets.

The second sample report shows similar output for DFSMSHsm data sets.

JCL and Control Statements:

```

/*-----1-----2-----3-----4-----5-----6-----7
/* IDENTIFY TAPES WITH ABR OR HSM ARCHIVED/MIGRATED DATA
/*-----1-----2-----3-----4-----5-----6-----7
/* DEFAULT NAME ABR ARCHIVE - FDRABR.V*.B*
/* DEFAULT NAME HSM MIGRATE - HSM.HMIGTAPE.**
/* CONTROL CARDS SET FOR REPORTING ON ABR ARCHIVE TAPES. TO GET HSM
/* MIGRATED TAPES, SWITCH THE XSELECT AND TITLE STATEMENTS.
/*-----1-----2-----3-----4-----5-----6-----7
//FDREPORT EXEC PGM=FDREPORT,REGION=0M
//RMMXTR DD DISP=SHR,DSN=extract-data-set-name
...
//SYSIN DD *
  XEXCLUDE TDSTATUS=(INIT,SCRATCH)
  XEXCLUDE TVEXDAYS=<90
  XSELECT TDDSNAME=FDRABR.V*.B*
* XSELECT TDDSNAME=HSM.HMIGTAPE.**
  TITLE LINE='TAPES WITH ABR ARCHIVED DATA -EXTRACT DATE=<TDXTDATE>'
* TITLE LINE='TAPES WITH HSM MIGRATED DATA -EXTRACT DATE=<TDXTDATE>'
  REPORT FIELD=(TDVOLSER,TDDSNAME,TDEXDATE,TDAPRSIZ)
  SORT FIELD=(TDVOLSER,TDDSNAME),BREAK=(SSP,NO)
  SUMMARY FIELD=(TDVOLSER,TDDSNAME,TDAPRSIZ)
  PRINT DATATYPE=RMMDSN,DISABLE=SUMVALUES,BYTEFORMAT=MEGABYTES
/*

```

FTP member name: [Archive_Tapes.txt](#)

Sample Outputs:

XSELECT TDDSNNAME=FDRABR.V*.B*

TAPES WITH ABR ARCHIVED DATA -EXTRACT DATE=2014.035			
VOLSER	DATA SET NAME	EXPDAT	APPROXSIZE
BA0124	FDRABR.VIDPBK0.B197338A		9.959M
BA0124	FDRABR.VIDPBK0.B198008A		9.468M
BA0124	FDRABR.VIDPBK0.B198008B		167.372M
...			
BA0124	FDRABR.VTSOWK1.B297338A		4.096M
SUBTOTAL -- TDVOLSER--BA0124			
TDVOLSER-----1 TDDSNNAME-----21 TDAPRSIZ--355683.328K			
...			
003213	FDRABR.VTSOWK1.B198071A	2015.124	149.419M
003213	FDRABR.VTSOWK1.B198071A	2015.124	61.098M
SUBTOTAL -- TDVOLSER--003213			
TDVOLSER-----1 TDDSNNAME-----257 TDAPRSIZ--13318.666M			
FINAL TOTALS --			
TDVOLSER-----55 TDDSNNAME-----21675 TDAPRSIZ--570176.670M			

XSELECT TDDSNNAME=HSM.HMIGTAPE.**

TAPES WITH HSM MIGRATED DATA -EXTRACT DATE=2013.326			
VOLSER	DATA SET NAME	EXPDAT	APPROXSIZE
250204	HSM.HMIGTAPE.DATASET	1999.365	714.195M
251120	HSM.HMIGTAPE.DATASET	1999.365	1413.890M
251196	HSM.HMIGTAPE.DATASET	1999.365	2531.918M
251312	HSM.HMIGTAPE.DATASET	1999.365	2834.203M
...			
499787	HSM.HMIGTAPE.DATASET	1999.365	1652.228M
499814	HSM.HMIGTAPE.DATASET	1999.365	2544.566M
FINAL TOTALS --			
TDVOLSER-----3142 TDDSNNAME-----3142 TDAPRSIZ--5564.319G			

3.8 Tapes with Permanent Errors

In order for the tape migration to run smoothly, it is a good idea to identify (ahead of time) any tapes that might present a problem when they are read as part of the migration process. Ideally, you would like to remove these tapes from the main migration process and deal with them separately so that they don't interrupt the smooth running of the main migration process.

This next example report uses field TVPRDERR to select tapes that have had more than 10 permanent read errors recorded against them by the tape management system. Using the TVPRDERR value, you can tailor the report to set the lower limit of read errors that you want a tape to exceed before being included in the report.

In the sample report, we are showing the tape volume and the number of permanent read errors. We've also added other useful information such as when the tape was last written to and when it was last read from, plus the unit address of the tape device onto where this tape was last mounted.

JCL and Control Statements:

```
//*-+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7
/* FDREPORT RUN AGAINST EXTRACTED FILE SELECTING ALL THE TAPES
/* WITH PERMANENT READ ERRORS
//*-+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7
//REPORT EXEC PGM=FDREPORT,REGION=0M
//RMMXTR DD DISP=SHR,DSN=extract-data-set-name
...
//SYSIN DD *
  EXCLUDE TVSTATUS=(INIT,SCRATCH)
  EXCLUDE TVEXDAYS=<90
  TITLE LINE='TAPES WITH PERMANENT READ ERRORS +
            - EXTRACT FILE <TVXTDATE>'
  IF (TVPRDERR>10) THEN(SELECT)
  REPORT FIELDS=(TVLRUN4B,TVVOLSER,TVLWDATE,TVLRDATE,TVPRDERR)
  SORT FIELD=(TVPWTErr),SEQUENCE=D
  PRINT DATATYPE=RMMVOL,PAGEWIDTH=52
/*
```

FTP member name: **Tapes_with_Permanent_Read_Errors.txt**

Any value can be used for the read error limit.

Sample Output:

TAPES WITH PERMANENT READ ERRORS - EXTRACT FILE 2013.326

LUNI	VOLSER	LWRDAT	LRDATE	PERMRDERR
0801	201638	2006.251	2006.251	92
080E	200204	2010.253	2013.254	116
080F	201450	2010.252	2010.271	106
0810	202032	2010.212	2010.212	211
080F	202740	2011.358	2012.141	38

3.9 Volume Usage Report

This next simple report repeats the list of all eligible tapes (i.e. excluding the soon-to-expire and SCRATCH and INIT tapes we identified in examples [3.3](#) and [3.4](#)) and it uses TVUSEBYT and TV%FULL to show us the amount of data and the percentage full status of each of those eligible tapes.

Our sample report is sorted by tape volser, but if you would prefer to see the report sorted by the %full figures (%FU), just change the SORT statement to FIELD=TV%FULL. And, if you add TV%FULL to the list of SUMMARY fields, you'll get a summary "percentage full" value across all selected/reported tapes to give an idea of how much, on average, each of your eligible tapes are being used.

JCL and Control Statements:

```
//*-+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7
/* TAPE VOLUME USAGE REPORT
/**-+-----+-----+-----+-----+-----+-----+-----+-----+-----7
//FDREPORT EXEC PGM=FDREPORT,REGION=0M
//RMMXTR DD DISP=SHR,DSN=extract-data-set-name
...
//SYSIN DD *
  XEXCLUDE TVSTATUS=(INIT,SCRATCH)
  XEXCLUDE TVEXDAYS=<90
  XSELECT TVVOLSER=*
  TITLE LINE='VOLUME USAGE REPORT +
          - EXTRACT FILE <TVXTDATE>'
  SORT FIELD=TVVOLSER
  REPORT FIELD=(TVVOLSER,TVUSEBYT,TV%FULL)
  SUMMARY FIELD=(TVVOLSER,TVUSEBYT)
  PRINT DATATYPE=RMMVOL,DISABLE=SUMVALUES,BYTEFORMAT=MEGABYTES,
        TITLE=LEFT
/*
```

FTP member name: **Volume_Usage_Report.txt**

Tapes with status INIT and SCRATCH and tapes to be excluded (in our example tapes that will expire in 90 days) are excluded from the list.

Sample Output:

VOLUME USAGE REPORT - EXTRACT FILE 2013.326		
VOLSER	VOLUSEBYTES	%FU
200002	21041.650M	29
200003	3694.789M	0
200004	21041.650M	29
200005	28800.102M	32
200007	3694.789M	0
200011	0.000M	7
200015	22052.438M	31
200017	20815.544M	7
200021	5612.859M	1
200022	46852.009M	26
200024	0.000M	3
200025	3694.789M	0
...		
253782	7.082M	1
253783	0.029M	0
253784	210.022M	12
253785	197.869M	8
FINAL TOTALS --		
TVVOLSER-----	5203	TVUSEBYT--38548.046G

3.10 Inventory of All Tapes Grouped by Location

If all the tapes that will be involved in the migration are stored in the same place, then the migration process will be straight forward. If, however, the tapes are stored in different locations, either on-site or off-site, then the locations of these tapes will need to be taken into account when planning out the practicalities of the physical handling of the tapes during the migration process.

We saw the LOCATION field (TVLOCAT) included as an informative column in examples [3.2](#), [3.3](#), and [3.4](#), but in this next report, we are focusing on the location as a key value and we are grouping the selected eligible tapes by their location.

As you can see from the sample outputs, we're using the BREAK option on the SORT statement to create a separate summary list and a summary of the eligible tapes at each location.

JCL and Control Statements:

```

/*-----1-----2-----3-----4-----5-----6-----7
/* INVENTORY OF ALL TAPES GROUPED BY LOCATION
/*-----+-----+-----+-----+-----+-----+-----7
//FDREPORT EXEC PGM=FDREPORT,REGION=0M
//RMMXTR DD DISP=SHR,DSN=extract-data-set-name
...
//SYSIN DD *
  XEXCLUDE TVSTATUS=(INIT,SCRATCH)
  XEXCLUDE TVEXDAYS=<90
  TITLE LINE='ALL TAPES GROUPED BY LOCATION <TVLOCAT> +
            - EXTRACT FILE <TVXTDATE>'
  SORT FIELD=(TVLOCAT,TVVOLSER),BREAK=(SEJ,NO)
  REPORT FIELD=(TVVOLSER,TVLOCAT,TVSTATUS)
  SUMMARY FIELD=TVVOLSER
  PRINT DATATYPE=RMMVOL,DISABLE=SUMVALUES,TITLE=LEFT,
        SORTALLOC=CYL,SORTCORE=8000000
/*

```

FTP member name: **Tapes_Grouped_by_Location.txt**

This is an inventory of the tapes grouped by location with totals by location.

Sample Output:

ALL TAPES GROUPED BY LOCATION DOSS - EXTRACT FILE 2013.326

VOLSER	LOCATION	VOLSTAT
250023	DOSS	MASTER
250036	DOSS	MASTER
...		
SUBTOTAL -- TVLOCAT---DOSS		
TVVOLSER-----13		

ALL TAPES GROUPED BY LOCATION DUMP - EXTRACT FILE 2013.326

VOLSER	LOCATION	VOLSTAT
200116	DUMP	MASTER
200234	DUMP	MASTER
...		
SUBTOTAL -- TVLOCAT---DUMP		
TVVOLSER-----95		

ALL TAPES GROUPED BY LOCATION MART - EXTRACT FILE 2013.326

VOLSER	LOCATION	VOLSTAT
200378	MART	MASTER
201046	MART	MASTER
203073	MART	MASTER
...		
SUBTOTAL -- TVLOCAT---MART		
TVVOLSER-----3		

SUBTOTAL -- TVLOCAT---SHELF		
TVVOLSER-----52580		
FINAL TOTALS --		
TVVOLSER-----52691		

3.11 Last Reference Report

When planning out the migration, another useful factor to keep in mind is the regularity with which each target migration tape has been used. It might be desirable, for example, to separate out the most recently used tapes from those that are used less frequently, and handle the migration of the two sets of tapes separately.

As an example, it might be prudent to migrate the often-used tapes out of prime working hours to avoid possible contention with the jobs wishing to use those tapes, but migrate the infrequently used tapes during the working day as there is less likelihood that they will be needed while the migration job is executing. There may be other client-specific reasons why migrating the tapes in an order dependent on their usage pattern may be required. It may even be decided that tapes that haven't been used for a specific period of time may not require migration at all.

In our example, we are interested in tapes that have not been referenced in the past 430 days. We've sorted the report by ascending Last Reference Date (TVLRDATE) so that the tapes that have not been referenced for the longest period of time appear first in the list.

We have included TVF1DSN to show the name of the first data set on the tape; this will give us an idea of what sort of data might be contained on the tape, and we have also included the creation date (TVCRDATE) so that we can see when the tape was first created.

As you can see from our sample report, many of the tapes at the beginning of our list appear to have been created some time ago, and were only referenced on that same day, or a few days after, but have not been referenced again since.

Depending on the number of tapes (in our case it's 74,220 that haven't been used for at least 430 days) a decision may be made to handle the migration of these tapes separately from the main migration project.

JCL and Control Statements:

```

/**+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7
/* LIST TAPES LAST REFERENCED MORE THAN 430 DAYS AGO
/**+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7
//FDREPORT EXEC PGM=FDREPORT,REGION=0M
//RMMXTR DD DISP=SHR,DSN=extract-data-set-name
...
//SYSIN DD *
  XEXCLUDE TVSTATUS=(INIT,SCRATCH)
  XEXCLUDE TVEXDAYS=<90
  XSELECT TVLRDAYS>430
  TITLE LINE='TAPE VOLUMES LAST REFERENCED MORE THAN 430 DAYS AGO +
            - EXTRACT FILE <TVXTDATE>'
  REPORT FIELD=(TVVOLSER,TVLRDATE,TVCRDATE,TVRTVALU
                TVEXDATE,TVF1DSN)
  SORT FIELD=(TVLRDATE,TVVOLSER)
  SUMMARY FIELD=(TVVOLSER,TVUSEBYT)
  PRINT DATATYPE=RMMVOL,DISABLE=SUMVALUES
/*

```

FTP member name: [Last_Reference_Report.txt](#)

Simple changes can be made in the example above using Creation Date or Last Reference Date. Use any number of days that suits your needs.

You can also use EXCLUDE or SELECT as you might want to exclude or select tapes that are in another location or tapes created by certain jobs:

- XSELECT/XEXCLUDE TVHOMLOC=location
- XSELECT/XEXCLUDE TVCRJOB=jobname

Sample Output:

TAPE VOLUMES LAST REFERENCED MORE THAN 430 DAYS AGO - EXTRACT FILE 2013.326						
VOLSER	LRDATE	CRDATE	RETENTVALU	EXPDAT	FIRST FILE	DATASET
501000	2000.000	2000.000		1999.365	A	
300100	2002.065	2002.065	WHILECATLG	2002.065	D03.A04077.AD9F2F.LCCC0040.SORT0503.VPLINK	
300220	2002.067	2002.066	WHILECATLG	2002.067	D03.A04050.RESATRT.LCJD601M.EQUAL	
301518	2002.070	2002.070	WHILECATLG	2002.070	D03.A04726.TS030.UPL0D01.WZIPS	
301639	2002.070	2002.070	WHILECATLG	2002.070	D06.A04050.RESTART.OFJD397P.SHISTORY.V#1	
301640	2002.070	2002.070	WHILECATLG	2002.070	A03.A04077.LC.LCJC002P.BACKALL.G0422V00	
302289	2002.071	2002.071		2029.208	A03.A04234.AHPPMSP.OHCONV.SAVE	
301104	2002.075	2002.068		2029.205	A06.A04077.SL.LCJD601P.PROD.YTD.G0170V00	
301130	2002.075	2002.068		2029.205	A03.A04077.LC.LCJD001P.PROD.YTD.G0171V00	
304319	2002.077	2002.074	WHILECATLG	2002.077	A03.A04077.LC.LCJC002P.BACKALL.G0423V00	
...						
474764	2012.336	2000.000	WHILECATLG	2012.341	A03.AA0242.TAI.BKPMTH.TAISECR.G0232V00	
474766	2012.336	2000.000	WHILECATLG	2012.341	A03.AA0242.TAI.BKPMTH.TAIBHST.G0165V00	
474768	2012.336	2000.000	WHILECATLG	2012.341	A03.AA0242.TAI.BKPMTH.TAIBHST.G0165V00	
474791	2012.336	2000.000		2014.335	A03.A04540.PE20YTD.VAN.G1211V00	
FINAL TOTALS --						
TVVOLSER-----		74220	TVUSEBYT--		67734.916G	

3.12 Identify Tapes that are Part of Multi-Volume Sets

One of the key areas often requiring special note or attention during a tape media migration project is the handling of multi-volume sets, i.e. tape data sets that span more than one tape volume. Generally, if one of the tape volumes in the set is migrated to new media, it is advisable to migrate all of the other volumes at the same time, or as soon after as possible.

This next example report uses a simple selection test on the existence of either a previous tape volume (TVPRVVOL) or a next tape volume (TVNXTVOL). If either of the values is non-blank, this indicates that the volume is part of a multi-volume tape set and that a data set contained on this volume is also on either the previous volume and/or the next volume in the sequence. The sample report is sorted in tape volume order and shows the sequence number of that tape volume, together with the volsers of the previous and next tapes in the sequence. The number of data sets on each volume is also shown.

In the first section of our sample output, we can see the existence of a very large data set that spans at least 118 tape volumes, 5 of which are displayed in the abridged report. We can see that the NXTVOL for tape 498681 (VSQ 4) is 498686, and this tallies with the PREVOL for 498686 (VSQ 5).

The 1-line summary at the end of our sample report shows that we have 51,911 tapes in the current library that are not self-contained and are part of a multi-volume set.

JCL and Control Statements:

```

/*-----1-----2-----3-----4-----5-----6-----7
/* TAPES THAT ARE PART OF MULTI-VOLUME SETS
/*-----+-----+-----+-----+-----+-----+-----+-----7
//FDREPORT EXEC PGM=FDREPORT,REGION=0M
//RMMXTR DD DISP=SHR,DSN=extract-data-set-name
...
//SYSIN DD *
  XEXCLUDE TVSTATUS=(INIT,SCRATCH)
  XEXCLUDE TVEXDAYS=<90
  IF (TVNXTVOL.NE.' ' OR TVPRVVOL.NE.' ') THEN(SELECT)
  TITLE LINE='TAPES IN MULTI-VOLUME SETS - EXTRACT FILE <TVXTDATE>'
  SORT FIELD=TVVOLSER
  REPORT FIELD=(TVVOLSER,TVVOLSEQ,TVDSNCNT,TVPRVVOL,TVNXTVOL)
  SUMMARY FIELD=(TVVOLSER,TVDSNCNT)
  PRINT DATATYPE=RMMVOL,DISABLE=SUMVALUES
/*

```

FTP member name: **Tapes_in_Multivolume_Sets.txt**

Sample Output:

TAPES THAT ARE PART OF MULTI-VOLUME SET - EXTRACT FILE 2013.326				
VOLSER	VSQ	DSCOUNT	PREVOL	NXTVOL
498680	118	1	492034	499814
498681	4	1	498443	498686
498682	32	1	498444	498689
498684	33	1	498616	498734
498686	5	1	498681	498688
...				
503062	1	2499		503035
503063	2	1	503049	
503064	1	2499		503061
503102	1	2499		503113
503113	2	1	503102	
...				
FINAL TOTALS		--		
TVVOLSER		-----51911	TVDSNCNT	-----94267

3.13 Single-Volume Multi-File Tapes

While there may be many tapes in the library with a single and very large data set spanning multiple tape volumes (see previous example), there may also be a number of tapes in the library that contain lots of small data sets and which are **not** part of a multi-volume tape set.

This next report shows us all of our tape volumes that are self-contained (“single volume”, not part of a multi-volume set) and which contain more than one tape data set (“multi-file”). The selection drivers for this report are once again TVNXTVOL and TVPRVVOL (which we used in the last report) but this time we are checking to make sure that both values are empty, and TVDSNCNT is checked to see that the data set count on the volume is greater than 1.

The sample output shows us the tape volser, the number of data sets on the tape, and the name of the first data set contained on that tape. In our sample we have 4,316 “single-volume, multi-file” tapes in our library.

JCL and Control Statements:

```
//*-+-----1-----2-----3-----4-----5-----6-----7
//* SINGLE VOLUME AND MULTIPLE FILES
//*-+-----+-----+-----+-----+-----+-----+-----7
//FDREPORT EXEC PGM=FDREPORT,REGION=0M
//RMMXTR DD DISP=SHR,DSN=extract-data-set-name
...
//SYSIN DD *
  XEXCLUDE TVSTATUS=(INIT,SCRATCH)
  XEXCLUDE TVEXDAYS=<90
  XSELECT TVDSNCNT>1,TVNXTVOL=' ',TVPRVVOL=' '
  TITLE LINE='SINGLE VOLUME MULTIPLE FILES +
            - EXTRACT FILE <TVXTDATE>'
  SORT FIELD=TVVOLSER
  REPORT FIELD=(TVF1DSN,TVVOLSER,TVDSNCNT)
  SUMMARY FIELD=TVVOLSER
  PRINT DATATYPE=RMMVOL,DISABLE=SUMVALUES,BYTEFORMAT=MEGABYTES
/*
```

FTP member name: [Single_Volume_Multi_File_Tapes.txt](#)

Sample Output:

SINGLE VOLUME MULTIPLE FILES - EXTRACT FILE 2013.326		
FIRST FILE DATASET	VOLSER	DSCOUNT
-----	-----	-----
A03.A00155.DIS.SAP.DE3AS1.APR1513.CLONEVOL	151168	9
A03.A00155.DIS.SAP.SP1AS1.JUN2813.CLONEVOL	151241	9
A03.A00155.DIS.SAP.SB1AS8.JAN2913.CLONEVOL	151297	9
...		
P03.P06.HAA.TSJDD07P.J08046.D3522112.0002000	501880	1300
P03.CTVINX.TSJDD01P.C13014.T174143.M25C0	501891	1395
P03.P06.HAA.TSJDD07P.J11400.D0212143.0005200	501897	1426
P03.CTVINX.TSJDD01P.C13049.T101733.M264B	501928	1147
P03.P06.HAA.TSJDD07P.J10743.D0562145.0001C00	501936	1456
P03.CTVINX.TSJDD01P.C13076.T155208.M292A	501953	2180
P03.CTVINX.TSJDD01P.C13154.T110108.M23A4	501960	1548
FINAL TOTALS --		
TVVOLSER-----	4316	TVDSNCNT-----71828

3.14 Single-Volume Single-File Tapes

As a continuation to the previous report, we are now looking for all self-contained tapes in the library that contain only 1 data set – “single volume, single file” tapes. The report is identical to the previous one, except that we now have TVDSNCNT set to equal 1.

In our sample output, we have 144,060 tapes in our library that currently each contain just a single data set.

JCL and Control Statements:

```
//*-+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7
/* SINGLE VOLUME AND SINGLE FILE
/**+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----7
//FDREPORT EXEC PGM=FDREPORT,REGION=0M
//RMMXTR DD DISP=SHR,DSN=extract-data-set-name
...
//SYSIN DD *
  XEXCLUDE TVSTATUS=(INIT,SCRATCH)
  XEXCLUDE TVEXDAYS=<90
  XSELECT TVDSNCNT=1,TVNXTVOL=' ',TVPRVOL=' '
  TITLE LINE='SINGLE VOLUME SINGLE FILE - EXTRACT FILE <TVXTDATE>'
  SORT FIELD=TVVOLSER
  REPORT FIELD=(TVF1DSN,TVVOLSER,TVDSNCNT)
  SUMMARY FIELD=TVVOLSER
  PRINT DATATYPE=RMMVOL,DISABLE=SUMVALUES,BYTEFORMAT=MEGABYTES
/*
```

FTP member name: [Single_Volume_Single_File_Tapes.txt](#)

Sample Output:

SINGLE VOLUME SINGLE FILE - EXTRACT FILE 2013.326		
FIRST FILE DATASET	VOLSER	DSCOUNT
-----	-----	-----
A03.A00155.STREAM.NORMAL.RRX7AEBF	151000	1
A03.A00155.STREAM.NORMAL.VCD6RFH3	151001	1
A03.A00155.STREAM.DISTR.YHN076K7	151002	1
A03.A00155.STREAM.DISTR.YHN071R3	151003	1
A03.A00155.STREAM.DISTR.YJVHDCAX	151005	1
A03.A00155.STREAM.DISTR.YESW7UMB	151006	1
A03.A00155.STREAM.DISTR.YESW7V7C	151007	1
A03.A00155.STREAM.DISTR.YESW80ED	151010	1
...		
OAM.PRIMARY.DATA	503106	1
OAM.PRIMARY.DATA	503118	1
OAM.PRIMARY.DATA	503121	1
A03.A04345.RSDGR16.C102059.T043141.E2099365	912196	1
FINAL TOTALS --		
TVVOLSER-----	144060	

3.15 Create FATSCOPY JOB & Control Statements with FDREPORT

All of the previous examples have shown FDREPORT being used to produce reports that would be useful during both the planning and execution phases of a tape migration project with FATSCOPY. In that context, the FATSCOPY jobs would be created manually based on information provided in the various reports.

Our final example is an illustration of using FDREPORT to automatically create a FATSCOPY job that can be used as part of the actual migration process itself.

The example job is divided into two sections:

- **RMMXTR** – this is the FDREPORT selection part of the process. In our example, we are selecting all tape volumes beginning with CCR or ABC which contain one or more data sets with a high-level qualifier of JAT. The resulting data is sorted into volume serial number sequence, and used in conjunction with the FDREPORT SELPCH feature to create FATSCOPY job streams.
- **MASK** – this is the template FATSCOPY JCL and control cards that will be used by SELPCH to create the FATSCOPY job. Each separate step within the created job will contain an execution of FATSCOPY with a single SELECT ALLDSN VOL=vvvvvv statement to copy the entire contents of the selected tape volume to the new media.

Note that the generated job is, by default, placed on the DD name SYSPUNCH, which is directed to SYSOUT=*. Once you are satisfied with the resulting job, all you need to do is change the SYSPUNCH DD statement "SYSOUT=(B,INTRDR)".

You should also consider adding "TYPRUN=HOLD" to the job card so that you will have an additional opportunity to review the generated job prior to its execution.

JCL and Control Statements (on next page)

JCL and Control Statements

```

/** This is a sample job designed to select tape volumes by data set
/** name mask from the tape management extract file.
/** The resulting data is sorted into volume serial number sequence,
/** and used in conjunction with the SELPCH mask below to create a
/** FATSCOPY job stream to copy all the datasets on the selected
/** volumes to another media.
/** Note that the generated job is, by default, placed on the DD name
/** SYSPUNCH which is directed to SYSOUT=*. Once you are satisfied
/** with the resulting job, please change the SYSPUNCH DD statement
/** "SYSOUT=(B,INTRDR)". It is also suggested that you add
/** "TYPRUN=HOLD" to the job card so you will have an additional
/** opportunity to review the generated job prior to execution.
/**+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7
...
//RMMXTR DD DSN=extract-data-set-name,DISP=SHR <-MOD
/** The SYSIN DD contains the FDREPORT selection and reporting
/** statements. In this example, we are selecting all the data sets
/** that match a specific DSN mask (JAT.***) and that reside on volumes
/** with VOLSERS that match either of two masks (CCR* or ABC*).
/** Will create JCL and control statements, each of which contains
/** 1 SELECT ALLDSN statement.
//SYSIN DD *
REPORT FIELD=(TDDSNAME,TDVOLSER)
PUNCH FDRLIB=MASK,ECHO
SORT FIELD=TDVOLSER
XSELECT TDDSNAME=JAT.EE.***,TDVOLSER=(CCR*,ABC*) <-MOD
PRINT DATATYPE=RMMDSN,RPTYPE=SELPCH
/*
/** The MASK DD contains the skeleton of the FATSCOPY job that will be
/** built by FDREPORT. Replace the information in lower-case with
/** values appropriate for your shop.
//MASK DD DATA,DLM=TL
)PREFIX
//jobname JOB jobcard <-MOD
//FATSCOPY EXEC PGM=FATSCOPY,REGION=0M
//STEPLIB DD DISP=SHR,DSN=fatscopy.load.library <-MOD
...
//AUDIT DD DISP=(NEW,CATLG),UNIT=SYSALLDA,SPACE=(TRK,(5,5)),
// DSN=my.auditdsn.D<RUNDATE>.T<RUNTIME>.S<$$CNT6> <-MOD
//DSNTABLE DD DISP=(NEW,CATLG),UNIT=SYSALLDA,SPACE=(TRK,(5,5)),
// DSN=my.restart.D<RUNDATE>.T<RUNTIME>.S<$$CNT6> <-MOD
//ERRORRPT DD SYSOUT=*
//SYSABEND DD SYSOUT=*
//TAPEOUT DD DSN=DUMMY1,DISP=(NEW,KEEP),UNIT=yourunit <-MOD
//SYSIN DD *
SIM
)ENDPREFIX
)DUPCHECK
SELECT ALLDSN,VOL=<VOL>
)ENDUPCHECK
)SUFFIX
/*
TL

```

FTP member name: [Create_FATSCOPY_Job_with_FDREPORT](#)

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Part 4

Examples and Additional Resources

FDREPORT is a planning tool that can be used with DFSMSrmm or CA 1 to query the tape management database using a broad range of powerful selection parameters.

FDREPORT is available to FATSCOPY customers at no charge for 90 days.

FDREPORT generates reports on the tape environment that you can use to determine which volumes you need to copy.

The examples in this section are excerpts from the February 2014 FYI Newsletter.

Please review the newsletter for descriptions and more information regarding these reports.

4.1 Sample FDREPORT Volume Usage Reports for RMM and CA 1

RMM REPORT - LIST OF VOLUMES & DATA SETS NOT EXPIRED IN VOLSER ORDER

VOLSER	DATA SET NAME	EXPDAT	EXDAY	%FU	APPROXSIZE	FILE SIZE	PHYSICALSIZ
200154	A03.A04345.RSDGR07.C109244.T023014.E2014338	2014.345	374	3	12619.874M	12619.612M	643825.664K
200159	A03.A04345.RSDBK07.C109244.T023015.E2014338	2014.345	374	3	12619.874M	12619.612M	13631.488K
200161	ANIC01.SMF.ESA.JAN12	2014.032	61	7	23410.199M	23409.459M	5249.171M

RMM REPORT - VOLUMES NOT IN SCRATCH STATUS

VOLSER	VOLSTAT	CRDATE	EXPDAT	RTDATE	RETENTVALU	DSCOUNT	PREVOL	NXTVOL	OWNER
FAT49P	MASTER	2008.088	1999.365	2008.093		1			SS001
FDR54P	MASTER	2008.088	1999.365	0					SS001
I00000	MASTER	2003.297	2012.358	2014.022		29	I03745	I00094	SS040

FOR CA1 - LIST OF VOLUMES & DATA SETS NOT EXPIRED & NOT EDM, IN VOLSER ORDER

VOLSER	VOLSTAT	NDSNB	%FU	CRDATE	CRDAY	EXPDAT	EXDAY	CA-1	DENSITY
800034		1	0	2013.119	205	2014.119	160	3590	CART TAPE
800041		0	7	2010.341	1079	1999.000	65635	3590	CART TAPE
800044		0	1	2012.286	404	2016.102	873	3590	CART TAPE

4.2 Sample FDREPORT Summary Reports

FDR400 FDRABR REPORT STANDARD SUMMARIES - FDREPORT VER 5.4/80 - INNOVATION DATA PROCESSING

RMM REPORT - TOTAL VOLUMES NOT IN SCRATCH STATUS:

FINAL TOTALS --

TVVOLSER-----200287

← Total Volumes Not in Scratch Status

FDR400 FDRABR REPORT STANDARD SUMMARIES - FDREPORT VER 5.4/80 - INNOVATION DATA PROCESSING

RMM REPORT - TOTAL VOLUMES IN SCRATCH STATUS:

FINAL TOTALS --

TVVOLSER-----61411

← Total Volumes in Scratch Status

FDR400 FDRABR REPORT STANDARD SUMMARIES - FDREPORT VER 5.4/80 - INNOVATION DATA PROCESSING

RMM REPORT - APPROX SIZE OF ALL EXPIRED DATA SETS & (NOT SCRATCH)

FINAL TOTALS --

TDAPRSIZ-----59.704T TDVOLSER-----138767

← Approx size of all expired data sets & (not SCRATCH) Total Terabytes

FDR400 FDRABR REPORT STANDARD SUMMARIES - FDREPORT VER 5.4/80 - INNOVATION DATA PROCESSING

RMM REPORT - APPROX SIZE OF ALL DATA SETS NOT EXPIRED & (NOT SCRATCH)

FINAL TOTALS --

TDAPRSIZ-----102.286T TDVOLSER-----61569

← Approx size of all data sets not expired & (not SCRATCH) Total Terabytes

4.3 Sample FDREPORT Summary Reports Using Grouping

Here we show a simple FDREPORT example of GROUPING on the VOLUME STATUS (MASTER, SCRATCH, etc.). Grouping can be used with many other fields such as expiration date, creating program/job, last reference date, and more. With groupings, you can get an overview of the groups (MASTER, SCRATCH, etc.) by looking at the subtotals per group and the final totals.

LIST ALL TAPES GROUPED PER VOLUME STATUS SCRATCH - EXTRACT FILE 2013.329

VOLSER	VOLSTAT	EXPDAT	LRDATE	LOCATION
100029	SCRATCH		2009.190	AWAATL1
100060	SCRATCH		2011.274	AWAATL1
...				
104610	SCRATCH			AWAATL1
SUBTOTAL -- TVSTATUS--SCRATCH				
TVVOLSER-----94				

LIST ALL TAPES GROUPED PER VOLUME STATUS MASTER - EXTRACT FILE 2013.329

VOLSER	VOLSTAT	EXPDAT	LRDATE	LOCATION
100048	MASTER	2010.062	2010.057	AWAATL1
100049	MASTER	2007.310	2013.239	AWAATL1
100050	MASTER	2009.295	2009.290	DISTANT
...				
SUBTOTAL -- TVSTATUS--MASTER				
TVVOLSER-----4518				
FINAL TOTALS --				
TVVOLSER-----4612				

← Total for both SCRATCH and MASTER

VOLUME USAGE REPORT - EXTRACT FILE 2013.326

VOLSER	VOLUSEBYTES	%FU
200002	21041.650M	29
200003	3694.789M	0
200004	21041.650M	29
200005	28800.102M	32
200007	3694.789M	0
200011	0.000M	7
200015	22052.438M	31
200017	20815.544M	7
200021	5612.859M	1
200022	46852.009M	26
200024	0.000M	3
200025	3694.789M	0
...		
253782	7.082M	1
253783	0.029M	0
253784	210.022M	12
253785	197.869M	8
FINAL TOTALS --		
TVVOLSER-----5203 TVUSEBYT--38548.80.046G		

← Total GIGABYTES

← Total Volumes

TAPES WITH PERMANENT ERRORS - EXTRACT FILE 2013.326

LUNI	VOLSER	LWRDAT	LRDATE	PERMRDERR	PERMWTErr
0801	201638	2006.251	2006.251	92	2
080E	200204	2010.253	2013.254	116	0
080F	201450	2010.252	2010.271	106	0
0810	202032	2010.212	2010.212	211	0
080F	202740	2011.358	2012.141	38	0

See [section 4.6 on page 33](#) on how to access these sample FDREPORT jobs.

4.4 Additional FATSCOPY Resources

[February 2014 FYI Newsletter focusing on FATS/FATAR/FATSCOPY](#)

[FATS, FATAR FATSCOPY User Manual](#)

[FATSCOPY How-To-Build-A-Job Guide](#)

[FATSCOPY Quick Start Guide](#)

[FATSCOPY Concepts & Facilities Guide](#)

[FATSCOPY Product Demo](#)

4.5 Additional FDREPORT Resources

[FDREPORT User Manual](#)

[FDREPORT Concepts & Facilities Guide](#)

4.6 How to Access Jobstreams and Output

The jobstreams and output for examples shown in this guide as well as additional FATSCOPY / FDREPORT examples are available from the INNOVATION DATA PROCESSING FTP site.

- Go to: www.fdr.com
- Click on “**FTP login**” and Enter your access code (if you don’t have one, you can request one on this webpage).
- Click on the “**Download**” directory, then “**Tech_Support_Samples**”, then:
 - “**FDREPORT_Tape_Migration_with_FATSCOPY_Examples**”
(for examples in this document)
 - “**FDREPORT_FATSCOPY_Examples**” (for additional FDREPORT & FATSCOPY examples)
 - “**FATSCOPY_Examples/Feb2014**” (for the Feb 2014 Newsletter examples)



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Using FDREPORT for Tape Migration with FATSCOPY